

# SLIDES WHICH FALL INTO THE CANAL

**THE Slides and Breaks and What They Mean—One Million Cubic Yards Still in Motion and Thirteen Millions Taken to the Dumps—How the Earth Moves and Where the Rock Flows Like Molasses—How the Canal Bed Humps Up—Something About the Baby Volcanoes and Steam Geysers of Culebra.**

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Special Correspondence of The Star.

CULEBRA, Canal Zone, Panama.

WANT to tell you something about the slides and breaks in the Culebra cut, the mighty masses of earth and rock which are sliding down into the big ditch that Uncle Sam is digging out of the Andes. It is hard to understand them without being

on the ground. But if you will take your foot in your hand and come with Col. David D. Gaillard, the famous engineer who has charge of the Culebra division, we shall see through the cut and look at them with our own eyes. There are plenty in sight even as I write these lines. There are two places nearby where more than 1,000,000 cubic yards of earth and rock are now moving.

The material in action is equal to a solid block 300 feet square and 200 feet high. Build it up as a cube and its base would be more than two acres and it would rise to the height of a thirty-story flat. That enormous quantity of rock is advancing at the rate of almost two feet per day and since the beginning of our digging we have had thirteen or fourteen times as much as that mass to take care of. The total has been over 13,000,000 cubic yards or enough material to make a wall three feet thick and as high as a two-story house reaching all the way from New York to Chicago.

It would make four mighty pyramids as big as Gizeh, and, all told, considerably more than the excavation we have yet to make. In the Culebra cut, had there been no slides the excavation for the canal would have been done long ago. As it is we have 1,000,000 cubic yards yet to dig and of this something like 1,000,000 are the direct result of the slides.

But let us climb down into the Culebra cut. As we stand here on the heights we can see it stretching to the right and the left until the windings of the mountains hide it from view. It is altogether nine miles in length and about 300 feet deep. The water level is 300 feet below the top of the mountains. In some places the mountains are so high that the water level is 300 feet below the top of the mountains. In some places the mountains are so high that the water level is 300 feet below the top of the mountains.

It is impossible to conceive the vast amount of earth that has been taken out. The figures convey no idea of the concrete dimensions. I will only say that up to this year we had taken out enough earth and rock to have built a wall 300 feet high, twelve feet thick and long enough to reach from the Capitol to the White House in Washington, or enough to have made six pyramids the size of Cheops and left something to spare. In one month we have taken out enough stuff to fill a ditch three feet wide and three feet deep from Boston to Chicago.

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**GO Through All Sorts of Hardships in Order that Museums Shall Reap Harvest of Their Work—Expeditions That Last for Many Years—Searching Among Savage Indians—One Young Scientist Is an Authority on Whales, While Another Studies and Gathers Specimens of Strange Birds.**

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## PHOTOGRAPH OF ELEVATION OF CANAL BED COLONEL GAILLARD AND I STOPPED TO WATCH THE MEN

As we go on I ask the colonel to tell us something about the slides. He shows us that these cracks mark their beginning, and later on in the cut we watch the earth coming down. There are several classes of slides. The first are those from the surface, consisting of the material lying above the bed rock. These are called slides of clay and other earth, and they may have a great deal of rock mixed in them. Such a slide is caused by the water of the canal, which is seeping into the earth and making it soft. The second class of slides are those from the bed rock. These are called slides of rock, and they are caused by the water of the canal, which is seeping into the rock and making it soft.

There is a big slide on the west side of the cut near Culebra which covers twenty-eight acres and another on the east side north of Gold Hill where about seventeen acres have broken off, weighing 1,200 feet back from the center line of the canal. So far an area something like 157 acres of slides has been taken out, and there are many acres still in motion. In addition to these surface slides, there are slides of the bed rock. These are called slides of rock, and they are caused by the water of the canal, which is seeping into the rock and making it soft.

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## SECOND PHOTOGRAPH TAKEN TWO MINUTES LATER. THE EARTH ROSE AND THREW THE RAILROAD TIES AND ALL TO ONE SIDE.

These surface slides have carried down great masses of material. Take the Culebra cut on the east side of the canal. The word Culebra means "cockroach," and this cockroach is the biggest of its kind upon earth. It covers an area of forty-seven acres and forms a great mass of earth which has broken off 1,800 feet from the center line of the canal.

It began when the French were still working, and it has caused us trouble ever since we started to dig. We have already moved out of it a mass of earth amounting to 2,000,000 cubic yards, and it is still active. At one time it came on ward at the rate of fourteen feet every day. Nevertheless the steam shovels are able to cope for it and all the other slides on the cut. The ordinary slide can be handled by one shovel, and this is so even when the slide is a long one.

At last we reached a slide which was a mile long and a hundred feet high. It was a slide of clay and other earth, and it was caused by the water of the canal, which was seeping into the earth and making it soft. The slide was so big that it was impossible to dig it out with the steam shovels. We had to use dynamite to break it up.

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## I INVESTIGATE A GEYSER

In December, 1911, two and one-half inches of water fell in three minutes, the rain falling in sheets so thick that one could hardly see his hand before his face. The rain continued at that rate for an hour, standing still on a flat plain enclosed by water-tight walls would have been drowned in two hours, and did the rain last all day at its close the water would be ten feet deep. Such rains are extraordinary in the Canal Zone. At about the same time and the rainfall at Culebra is far less than at Porto Bello. Nevertheless it is such that it must be reckoned with in connection with slides.

As we make our way through the cut with Col. Gaillard we can see the baby volcanoes, which have alarmed the ignorant as to the future of the canal. They are not really volcanoes, but are heated areas where the elements of condition of the earth is such that it oxidizes upon exposure to the air and scatters in the form of steam. The steam, and in others the ground is so warm that you cannot put your hand in it.

These hot spots are found at various depths, and they are often of such a temperature that dynamite would not explode if put down into a hole, drilled through them. For this reason a long iron pipe is dropped down into the hole, and the pipe is heated by a gas flame. The gas is left there for ten minutes and then taken out. Now, by running the pipe along the hole, the heat is carried to the bottom of the hole, and the heat is so great that the pipe at that place is so hot that it is impossible to touch it. This is a hot place in the hole as this heat is carried to that place. I am told that some of the material now being handled would fire dynamite if brought near it.

In going through the cut with Col. Gaillard the other day I climbed the side of a hill to the place where the steam was coming out. In some places the steam and sulphur and brimstone was strong, and I had to get to windward to prevent being burned. In some places the steam was so strong that the gas might be poisonous. I reached down and put my hand in a hole, and the steam was so hot that it was impossible to touch it. This is a hot place in the hole as this heat is carried to that place. I am told that some of the material now being handled would fire dynamite if brought near it.

In looking at the earth near the steam, I saw a hole in the ground, and I put my hand on the surface. There was no sign of heat, but when I scraped away a bit of the soil, I found it was so hot that it was impossible to touch it. This is a hot place in the hole as this heat is carried to that place. I am told that some of the material now being handled would fire dynamite if brought near it.

The surface slides will likewise stop as soon as the natural slope of the earth is reached, although in this account will have to be taken of the immense rainfall, which adds to the weight. The rains here are often exceedingly heavy, retarding the work. During the wet season the clay flows down like a river and it takes time to clear the railroad of mud. As an instance of the rainfall, there are some places on the isthmus where it has spouts as heavy as anywhere in the world. At Porto Bello

Col. Gaillard tells me that there has not been one week during the past three years when the bottom of the canal has not been heaving and rising, but he adds that the heaving grows less and less as the weight from the slides of the cut is removed, and the higher banks properly sloped. At present the only place where the earth is so working is right under Gold Hill. The trouble occurs within a length of perhaps 200 feet, whereas it formerly extended over 2,000 feet. The wings make it necessary to rebuild a great deal of track, and on this account have already been shifted. This is one of the necessities of the work, however, and it will all be remedied when the canal has been properly sloped and the strata is again in equilibrium.

Slides of strata such as I have described are common, but the engineers know how to control them. They have learned so much about the strata that they are now taking as a matter of course. The hump I saw today will be all out of the way before night. Four hundred men are at it and it is sending it down to Balboa.

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# YOUNG COLLEGE MEN WHO SEARCH FAR COUNTRIES FOR THE BENEFIT OF SCIENCE

heretofore unexplored frozen islands north of Coronation Gulf, along the northernmost contour of Canada, without a dollar in his pocket, with only a few pounds of ammunition, plucking out a living through his own resourcefulness among Eskimos, in order to complete his ethnological studies and finish his geographic observations.

In 1907 he and another young man named Anderson left for the Mackenzie and Coppermine River country for a three-year trip under the auspices of the American Museum of Natural History. At the end of the period Stefansson wrote that they had found so much to interest them, and that they were going to return, had made no provision for a longer journey, and, moreover, had no way to get supplies to them. Therefore, flinging caution to the winds, the two young men set out on their journey.

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pedition alone from the Mackenzie river to James Bay. In the depths of the back country, where the Indians are few and far between, he was a marked policeman once in a year. Skinner made some unusual studies of Indian life and habits that he already established him as an authority on Indian subjects. Practically all his journey was made alone in a canoe, and when one learns of the hair-raising experiences that he passed through, the marvel is that he ever survived.

One evening he stopped a hundred or more miles north of Port Hope and fell in with a canoe of Eskimos. He was in with a canoe of Eskimos. He was in with a canoe of Eskimos. He was in with a canoe of Eskimos. He was in with a canoe of Eskimos.

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nearest settlement, he will pluckily make his investigation and collect his specimens. He is so sure that, after he has worked there five or six months, he will return to the South Shetland Islands, Long Island, and the Cape Horn.

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